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AL INDUSTRY OF PENNSYLVANIA IN 1984

L. J. Prosser, Jr.
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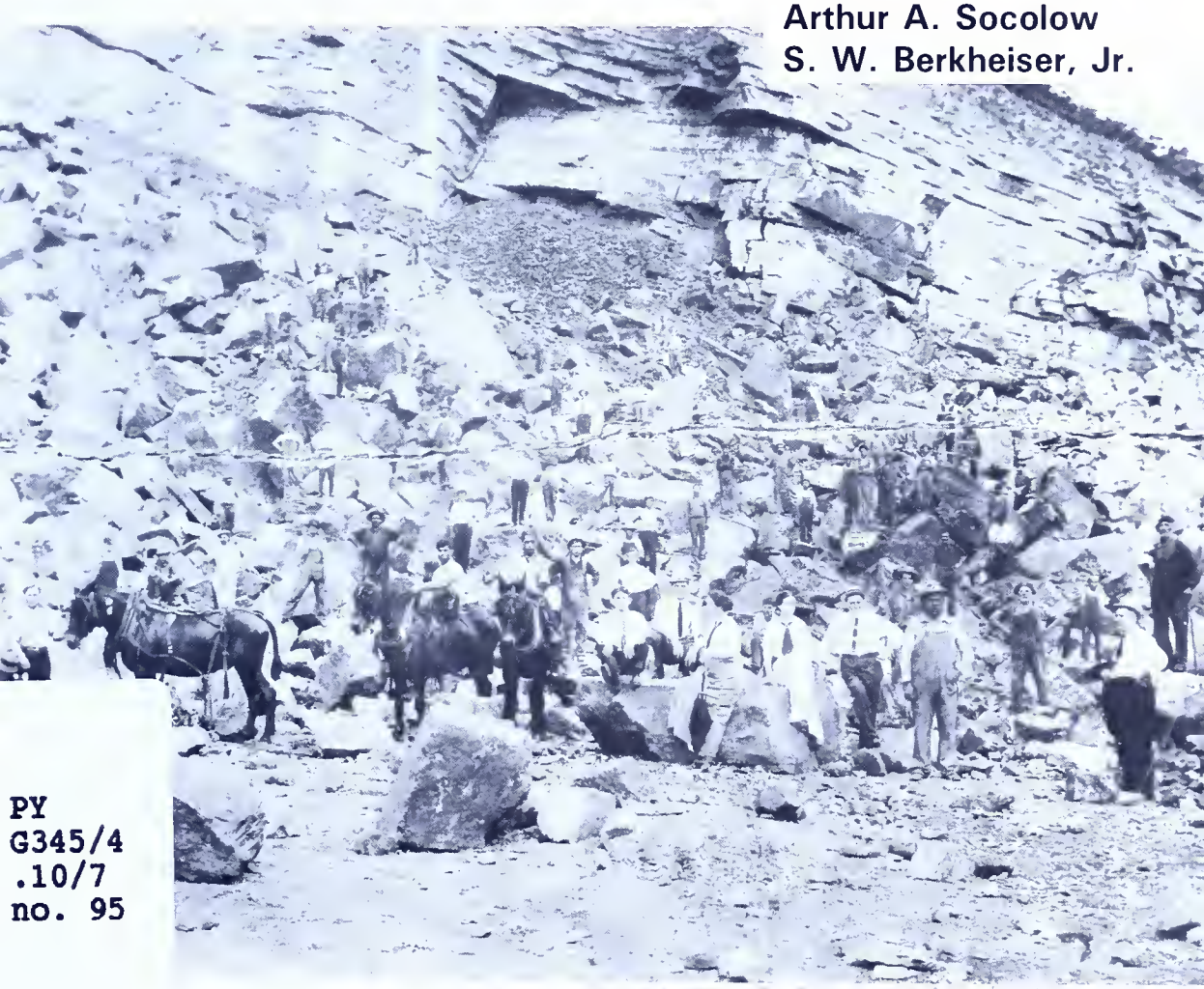

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TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist

ON THE COVER: Quarry face and work force of Warner Company's Union Furnace No. 2 limestone quarry, circa 1916. This photograph recorded the first ''shot'' ever made at the quarry using machine-drilled blast holes, which are visible in the upper left-hand corner of the quarry face. Notice the size of the rocks in the muck pile. The workmen used sledge hammers, pry bars, and stone forks to crush the rocks and reduce them in size. Mule-powered railcars transported the sized stones from the quarry face to a battery of eight vertical-shaft draw kilns. When viewed during an evening train ride between Huntingdon and Altoona, the aesthetically pleasing red glow of the kilns was a delight to see (Carl Leamer, personal communication, 1986). Since the time of the first European settlements in ''Penn's Woods,'' kiln products from Pennsylvania have played a significant role in the development of our nation. Photograph courtesy of Warner Company.

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Preprint from the 1984

BUREAU OF MINES MINERALS YEARBOOK

The Mineral Industry of Pennsylvania

UNITED STATES DEPARTMENT OF THE INTERIOR

UNITED STATES DEPARTMENT OF THE INTERIOR • Donald Paul Hodel, Secretary

BUREAU OF MINES • Robert C. Horton, Director

This publicotion is o chopter from the current Bureou of Mines Minerals Yeorbook, comprising *Volume I, Metals and Minerals; Volume II, Area Reports: Domestic; Volume III, Area Reports: International.* The seporote volumes of the Yearbook ore sold by the Superintendent of Documents, Woshington, D.C. 20402.

The Mineral Industry of Pennsylvania

This chapter has been prepared under a Memorandum of Understanding between the Bureau of Mines, U.S. Department of the Interior, and the Pennsylvania Bureau of Topographic and Geologic Survey, Department of Environmental Resources, for collecting information on all nonfuel minerals.

By L. J. Prosser, Jr.,[1] Arthur A. Socolow,[2] and S. W. Berkheiser, Jr.[3]

The value of nonfuel mineral production in Pennsylvania was $708.4 million in 1984, the highest total since the $721.7 million in 1979. Pennsylvania continued as a leading domestic producer of cement, lime, and crushed stone. About 8% of the Nation's cement, 10% of the lime, and 6% of the crushed stone was produced in the State in 1984. These commodities accounted for over four-fifths of the State's total value of mineral production.

The State's iron and steel industry recorded a slight increase in production in 1984 but remained depressed in comparison to the late 1970's. United States Steel Corp. (USS) and Bethlehem Steel Corp., in a joint effort, were awarded a $29 million research contract aimed at developing state-of-the-art technology in casting steel.

The Pennsylvania Wilderness Act was signed into law, creating the State's first wilderness area in the 750,000-acre Allegheny National Forest.

Table 1.—Nonfuel mineral production in Pennsylvania[1]

Mineral		1983 Quantity	1983 Value (thousands)	1984 Quantity	1984 Value (thousands)
Cement:					
Masonry	thousand short tons	262	$17,095	298	$20,849
Portland	do	5,154	218,539	5,735	281,590
Clays[2]	do	916	4,311	963	4,050
Gem stones		NA	5	NA	5
Lime	thousand short tons	1,507	81,682	1,620	90,182
Peat	do	22	628	24	693
Sand and gravel (construction)	do	e11,800	e52,000	14,472	64,285
Stone:					
Crushed	do	51,523	226,948	e56,200	e228,000
Dimension	do	53	5,799	e44	e6,001
Zinc (recoverable content of ores, etc.)	metric tons	16,792	15,322	--	--
Combined value of clays (kaolin), mica (scrap), and sand and gravel (industrial)		XX	12,812	XX	12,701
Total		XX	635,141	XX	708,356

eEstimated NA Not available. XX Not applicable.
[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Excludes kaolin; value included with "Combined value" figure.

Table 2.—Value of nonfuel mineral production in Pennsylvania, by county[1]

(Thousands)

County	1982	1983	Minerals produced in 1983 in order of value
Adams	$9,747	W	Stone (crushed), lime, clays, mica.
Allegheny	17,377	W	Cement, stone (crushed), clays, sand (industrial).
Armstrong	W	$2,133	Stone (crushed), clays.
Beaver	9,189	W	Clays.
Bedford	(2)	W	Stone (crushed).
Berks	W	W	Cement, stone (crushed), clays.
Blair	(2)	11,496	Stone (crushed).
Bradford	921	(3)	
Bucks	W	13,433	Stone (crushed), stone (dimension), clays.
Butler	17,140	W	Lime, cement, stone (crushed).
Cameron	W	(3)	
Carbon	912	(3)	
Centre	18,672	34,290	Lime, stone (crushed).
Chester	W	W	Stone (crushed), lime, stone (dimension), clays.
Clearfield	W	154	Clays.
Clinton	536	657	Stone (crushed), clays.
Columbia	W	W	Stone (crushed).
Crawford	1,094	(3)	
Cumberland	923	4,189	Stone (crushed).
Dauphin	W	4,388	Do.
Delaware	(2)	W	Stone (crushed), stone (dimension).
Elk	(2)	W	Stone (crushed).
Erie	4,096	59	Peat.
Fayette		8,832	Stone (crushed).
Forest	W	W	Do.
Franklin	W	W	Do.
Fulton	W	W	Do.
Huntingdon	W	W	Sand (industrial), stone (crushed).
Jefferson	W	W	Clays, stone (crushed).
Juniata	(2)	W	Stone (crushed).
Lackawanna	W	1,097	Stone (crushed), peat.
Lancaster	973	W	Stone (crushed), clays.
Lawrence	24,418	W	Cement, stone (crushed), clays, peat.
Lebanon	W	W	Lime, stone (crushed).
Lehigh	W	W	Cement, zinc, stone (crushed), stone (dimension).
Luzerne	W	W	Stone (crushed), peat.
Lycoming	W	W	Stone (crushed).
McKean	W	92	Do.
Mercer	2,106	W	Do.
Mifflin	W	W	Stone (crushed), lime.
Monroe	1,115	W	Stone (crushed), clays, peat.
Montgomery	W	22,355	Stone (crushed), lime, stone (dimension).
Montour	(2)	W	Stone (crushed).
Northampton	113,301	128,368	Cement, stone (crushed), stone (dimension).
Northumberland	907	W	Stone (crushed), clays.
Perry	(2)	W	Stone (crushed).
Pike	101	W	Do.
Potter	(2)		
Schuylkill	W	919	Do.
Snyder	(2)	W	Do.
Somerset	1,778	W	Stone (crushed), clays.
Susquehanna	W	W	Stone (crushed), stone (dimension).
Tioga	W	W	Stone (crushed).
Union	65	W	Stone (crushed), clays.
Venango	W	W	Stone (crushed), sand (industrial).
Warren	2,499	(3)	
Wayne	W	W	Stone (crushed), stone (dimension).
Westmoreland	W	10,005	Stone (crushed).
Wyoming	W	1	Stone (dimension).
York	14,604	46,214	Stone (crushed), lime, cement, clays.
Undistributed[4]	152,924	294,458	
Sand and gravel (construction)	XX	e52,000	
Stone:			
Crushed	e200,900	XX	
Dimension	r e5,033	XX	
Total[5]	r601,329	635,141	

eEstimated rRevised. W Withheld to avoid disclosing company proprietary data; included with "Undistributed." XX Not applicable.

[1]No production of nonfuel mineral commodities was reported for counties not listed.

[2]Crushed and dimension stone was produced; data not available by county. Total State values are shown separately under "Stone."

[3]Construction sand and gravel was produced, data not available by county. Total State value is shown separately under "Sand and gravel (construction)."

[4]Includes gem stones that cannot be assigned to specific counties and values indicated by symbol W.

[5]Data may not add to totals shown because of independent rounding.

Table 3.—Indicators of Pennsylvania business activity

		1982[r]	1983	1984[p]
Employment and labor force, annual average:				
Population	thousands	11,879	11,889	11,901
Total civilian labor force	do.	5,487	5,506	5,487
Unemployment	do.	599	650	499
Employment (nonagricultural):				
Mining total[1]	do.	45.7	39.0	38.7
Metal mining[2]	do.	.2	.2	NA
Nonmetallic minerals except fuels	do.	4.2	3.9	4.0
Coal mining	do.	35.8	30.1	29.3
Oil and gas extraction[2]	do.	5.4	4.8	NA
Manufacturing total	do.	1,170.5	1,095.8	1,119.8
Primary metal industries	do.	143.3	120.4	118.3
Stone, clay, and glass products	do.	51.4	48.7	48.9
Chemicals and allied products	do.	59.2	58.1	58.7
Petroleum and coal products	do.	16.4	14.8	12.8
Construction	do.	168.1	165.7	175.7
Transportation and public utilities	do.	249.0	239.7	246.3
Wholesale and retail trade	do.	978.8	994.1	1,032.8
Finance, insurance, real estate	do.	239.6	243.0	253.5
Services	do.	1,046.0	1,073.2	1,108.3
Government and government enterprises	do.	682.5	673.7	672.0
Total[3]	do.	4,580.1	4,524.3	4,647.0
Personal income:				
Total	millions	$129,772	$136,023	$146,545
Per capita		$10,925	$11,441	$12,314
Hours and earnings:				
Total average weekly hours, production workers		38.4	39.2	40.2
Mining (nonmetallic minerals, except fuels)		42.5	43.4	44.6
Total average hourly earnings, production workers		$8.63	$8.95	$9.28
Mining (nonmetallic minerals, except fuels)		$8.81	$8.99	$9.34
Earnings by industry:				
Farm income	millions	$723	$636	$944
Nonfarm	do.	$88,552	$92,665	$100,485
Mining total	do.	$1,495	$1,262	$1,378
Metal mining	do.	$4	$5	[4]
Nonmetallic minerals except fuels	do.	$88	$87	$91
Coal mining	do.	$1,182	W	W
Oil and gas extraction	do.	$221	W	W
Manufacturing total	do.	$27,702	$27,208	$29,391
Primary metal industries	do.	$4,683	$4,025	$4,162
Stone, clay, and glass products	do.	$1,275	$1,284	$1,358
Chemicals and allied products	do.	$1,746	$1,861	$1,999
Petroleum and coal products	do.	$747	$725	$716
Construction	do.	$4,284	$4,561	$4,976
Transportation and public utilities	do.	$6,863	$7,146	$7,581
Wholesale and retail trade	do.	$13,303	$14,148	$15,404
Finance, insurance, real estate	do.	$4,691	$5,319	$5,876
Services	do.	$17,732	$19,741	$21,885
Government and government enterprises	do.	$12,254	$13,039	$13,729
Construction activity:				
Number of private and public residential units authorized		22,271	33,508	36,770
Value of nonresidential construction	millions	$1,560.2	$1,744.3	$1,955.3
Value of State road contract awards	do.	$275.0	$298.0	$94.0
Shipments of portland and masonry cement to and within the State	thousand short tons	2,310	2,417	2,686
Nonfuel mineral production value:				
Total crude mineral value	millions	$601.3	$635.1	$708.4
Value per capita		$51	$53	$60

[p]Preliminary. [r]Revised NA Not available. W Withheld to avoid disclosing company proprietary data.
[1]Bureau of Labor Statistics, U.S. Department of Labor; totals may not add because of inclusion of data from other sources.
[2]Bureau of Economic Analysis, Regional Economic Measurement Division, U.S. Department of Commerce.
[3]Data may not add to totals shown because of independent rounding.
[4]Less than 1/2 unit.

Sources: U.S. Department of Commerce, U.S. Department of Labor, Highway and Heavy Construction Magazine, and U.S. Bureau of Mines.

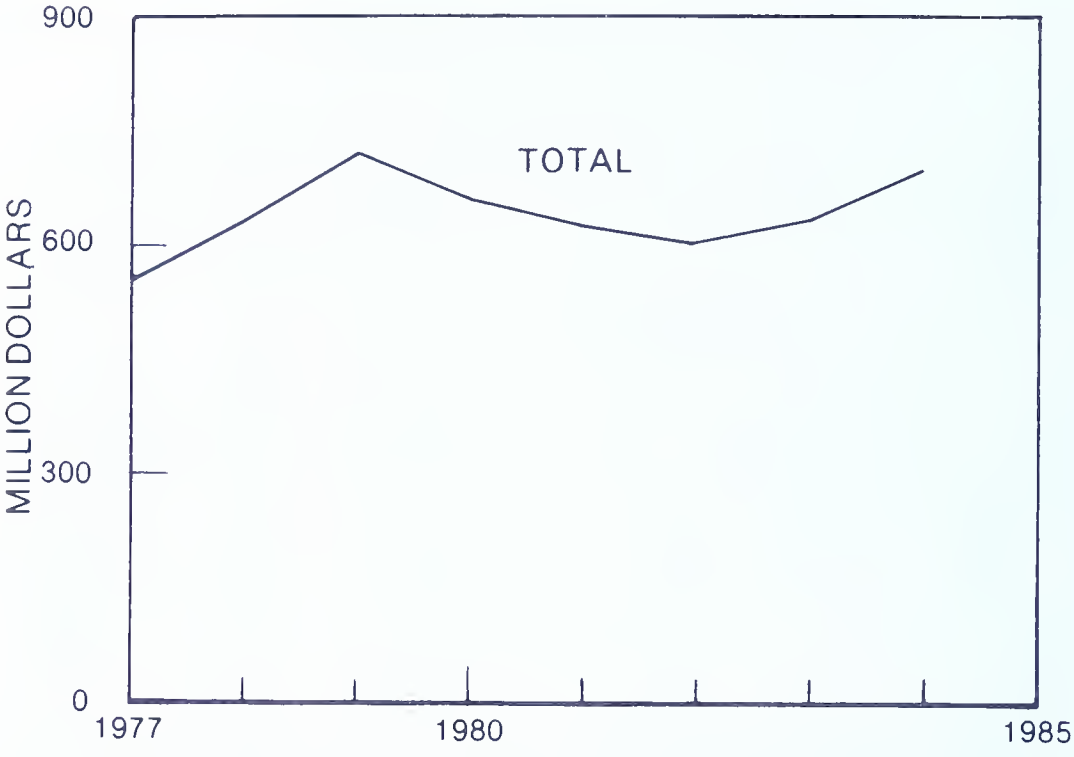

Figure 1.—Total value of nonfuel mineral production in Pennsylvania.

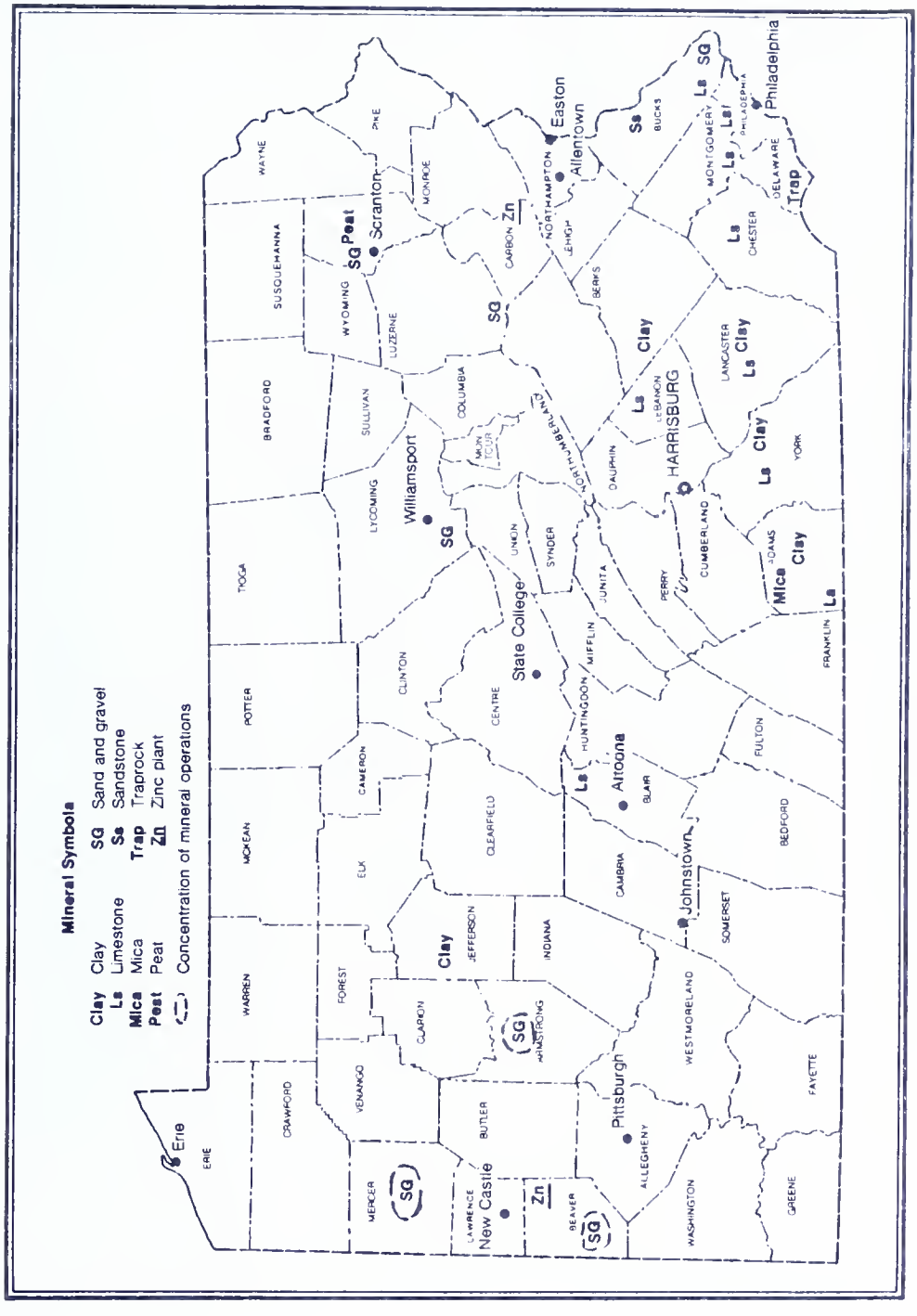

Figure 2.—Principal mineral producing localities in Pennsylvania.

Legislation and Government Programs.—In 1984, the Surface Mining Conservation and Reclamation Act (SMCRA) was amended (House Bill 1176) to provide separate requirements for the State's noncoal mining industry. Previously, all mining activities in Pennsylvania were included in a single surface mining law. The amendment essentially differentiates the requirements for reclamation and contouring between coal and noncoal mining operations as provided in Subchapter E, Surface Non-Coal Mining Operations, Section 77.102 of the SMCRA.

Public Act 158 (Senate Bill 1309) amended State reclamation regulations to allow coal operators to re-mine abandoned sites without responsibility for previous water pollution. The legislation was expected to result in the mining of an estimated 300 million short tons of coal and provided a $75 million savings in reclamation costs. In 1984, the State received $44.3 million in abandoned mine reclamation funds from the Federal Office of Surface Mining.

Federal legislation concerning Pennsylvania in 1984 included enactment of the Pennsylvania Wilderness Act creating the State's first wilderness area in the 750,000-acre Allegheny National Forest. The law prohibits all oil, gas, mineral, and timber development in a tract of about 9,800 acres and authorized $2 million for purchase of oil, gas, and mineral rights in the wilderness area. The act also designated about 23,000 acres of the forest as a National Recreation Area, which allows limited development subject to environmental safeguards.

Also approved by the U.S. Congress was $42 million in funding for relocation of residents in Centralia and Bynersville in northeastern Pennsylvania. Underground coal mine fires have been spreading in the area since 1962 causing health and safety problems.

Unresolved at yearend was a proposal in the U.S. Congress to sell the federally owned Consolidated Railroad Corp. (Conrail) to private interests. About 15,000 Pennsylvanians are employed by Conrail, nearly 40% of the company's work force. Also, about 28% (4,014 miles) of the railroad's system is in the State. The State's steel, coal, and other mineral producers heavily dependent on rail transportation were concerned that the sale could result in abandonment of some routes and reduce competition in the East affecting freight rates.

The Pennsylvania Bureau of Topographic and Geologic Survey's mineral resources program completed a number of reports, including 1 on the geology and mineralogy of 55 copper-uranium occurrences in Lycoming and Sullivan Counties.[4] High-purity silica sources from 9 Paleozoic formations and 6 quartz veins were sampled, chemically analyzed, and described from 30 locations in 14 counties in central and eastern Pennsylvania.[5] The geology, mineralogy, mining, and milling of slate in Pennsylvania was summarized.[6] The State's slate industry produced flagging, flooring tiles, blackboards, roofing structural slates, and was the only U.S. producer of electrical and billiard slates in 1984.

Fetid barite occurrences from 11 locations were discovered and described in western Berks County. The host rock was a black shale of Cambro-Ordovician Age known as the Hamburg sequence.[7] A modern account of the brickmaking process at Watsontown in Northumberland County was described.[8] In addition, a kaolinitic white clay occurrence having medium- and high-duty refractory potential, as well as structural clay product potential, was discovered in Berks County.[9] The only active aggregate producer mining both sedimentary and crystalline rocks in the Reading Prong was described.[10] This operation mined a quartzite that was the only Pennsylvania Department of Transportation-approved bedrock source that met the highest skid resistance level for bituminous surfaces in southeastern Pennsylvania.

Continuing Survey projects included investigations on the distribution and uses of carbonate rocks, compilation of a directory of nonfuel mineral producers, a summary of the State's clay and shale mining industry in relation to construction markets, and a study of the petrologic and geographic distribution of uranium and thorium mineralization for the Reading Prong in eastern Pennsylvania. Reports on these projects were expected to be completed in 1985.

Also during the year, the U.S. Geological Survey evaluated a Noril'sk-type model for platinum-group mineralization associated with Jurassic diabase sheets.

Federal programs included ongoing health and safety research at the U.S. Bureau of Mines Pittsburgh Research Center. Demonstrated during the year was a new, more cost-effective method for treating acid mine drainage. Total capital cost for the new system was estimated at one-fifth

of conventional systems based on preliminary tests.[11] The Bureau also allocated funds to the Mining and Mineral Resources Research Institute at Pennsylvania State University. This was designed to encourage the training of engineers and scientists in mineral-related disciplines.

The U.S. Department of Energy awarded a $33.7 million contract to KRW Energy Systems Inc. for development of a program in advanced coal gasification technology. The 32-month program will be conducted at KRW's facility in Madison, Westmoreland County, and focus on efficiently designing a system that produces environmentally clean gaseous and liquid fuels.

Federal- and industry-funded research efforts focused on clean energy technology. At the Homer City Generating Complex in Indiana County, three 600- to 650-megawatt pulverized coal-fired generating units, a state-of-the-art analytical coal laboratory, a 1,200-ton-per-hour coal cleaning technology plant, and a coal cleaning test facility were utilized in determining how different coals react to various cleaning processes and in studying ways of improving coal cleaning processes.

REVIEW BY NONFUEL MINERAL COMMODITIES

NONMETALS

In this section, nonfuel mineral commodities that were mined in Pennsylvania in 1984 are discussed. Quantity and value data for these commodities are given in table 1. Traditionally, cement and lime data are also presented in table 1. The State ranked ninth nationally in value of mineral production in 1984.

Other industrial minerals manufactured or processed in Pennsylvania from raw materials mined out-of-State or imported included graphite, gypsum, perlite, pyrophyllite, quartz crystal, slag, sulfur, sulfuric acid, and vermiculite. The combined value of these commodities was $97.2 million.

Cement.—Shipments in 1984 increased for the second consecutive year and improved nearly 1 million short tons compared with 1982 levels. The cement industry's performance in Pennsylvania reflected strong demand in the housing, highway, and commercial construction sectors. The housing market began to rebound in 1983, as interest rates declined and stabilized, increasing demand for cement for use in concrete foundations and floors. A shift in the economy in the Northeast toward more service, financial, and defense-related industries, as heavy manufacturing declined, spurred office building and commercial construction. Reconstruction of the interstate highway system also boosted cement sales in the eastern part of the State.

Cement data for Pennsylvania are divided into two districts: eastern Pennsylvania, which is all counties east of the eastern boundaries of Potter, Clinton, Centre, Huntingdon, and Franklin Counties; and western Pennsylvania, which is all other counties in the State. In 1984, the State's nine eastern plants produced 4.5 million tons of portland cement utilizing about 88% of capacity. The State's four western plants produced about 1.3 million tons of portland cement utilizing about 55% of capacity.

During the year, Keystone Portland Cement Co., Bath, was acquired by Giant Portland Cement Co., Columbia, SC. Giant Portland obtained 51% of Keystone's outstanding shares under a merger agreement valued at $15 million. Keystone's annual production capacity is 600,000 tons.[12]

Coplay Cement Manufacturing Co. acquired Louisville Cement Co.'s two plants in Logansport and Speed, IN, for about $112 million. Coplay, a subsidiary of Société des Ciments Français (SCF), operated a 1.1-million-ton-per-year-capacity plant in Nazareth, PA, and a 400,000-ton-per-year-capacity plant in Frederick, MD. The acquisition doubled SCF's annual capacity in the United States to about 3 million tons. SCF operated 15 plants in France with a total annual capacity of 10 million tons.[13]

Fuller International Inc., Bethlehem, PA, signed a 10-year contract with China to develop that country's cement technology. About 60% of China's cement production is from small plants with an average annual output of about 20,000 tons. The agreement with Fuller included plans to modernize plants, improve cement quality, conserve energy through use of more efficient machinery, and lower operating costs, particularly at the smaller plants.

Clays.—Production of clay and shale increased in 1984, ending a period of five consecutive years of decline. Demand, primarily from the cement industry, resulted in reversing the downward trend.

Although output improved in 1984, the State's clay industry remained depressed in comparison with that of the 1970's. In 1973,

a 10-year record high 3 million short tons of clay and shale was produced. Also, about 225,000 tons of clay was used in production of about 8.6 million tons of portland cement. In 1984, Pennsylvania's total cement manufacturing production capacity was 7.5 million tons and clay used in manufacture totaled about 85,000 tons.

Table 4.—Pennsylvania: Clays sold or used by producers, by use[1]

(Short tons)

Use	1983	1984
Common brick	47,002	4,000
Face brick	723,576	761,237
Firebrick, blocks and shapes	24,373	15,524
Flue linings	22,631	24,220
Mortar and cement, refractory	10,993	38,812
Portland and other cements	51,429	85,107
Tile: Drain, quarry, structural	31,929	31,120
Other[2]	4,031	2,935
Exports: Mortar, cement, other refractory	260	--
Total	916,224	962,955

[1]Excludes kaolin.
[2]Includes paint, lightweight aggregates, highway surfacing, and structural concrete.

Gem Stones.—Mineral specimens and semiprecious gem stones were collected by rockhounds and mineral dealers. Estimated value in Pennsylvania in 1984, was $5,000.

Lime.—Output increased slightly in 1984, primarily reflecting a similar gain by the State's steel industry. About 50% of the lime manufactured in the State was used in basic oxygen furnace and electric steelmaking. Most of the State's lime was produced in the southeastern part of the State.

Warner Co., one of the State's leading producers, continued operating the nearly depleted underground Bell Mine in Bellefonte. A nearby open pit limestone quarry was developed to supplement kiln feed and was expected to eventually replace the underground mine. Toward yearend, the firm laid off one-half of its employees, citing a slower than expected improvement in sales to the steel industry. About 40% of Warner's output was consumed by the steel industry. Sales increased for environmental uses, such as sulfur removal from stack gases, mine and plant acid water neutralization, and sewage treatment.[14]

Table 5.—Pennsylvania: Lime sold and used by producers, by use

Use	1983		1984	
	Quantity (short tons)	Value (thousands)	Quantity (short tons)	Value (thousands)
Steel, basic oxygen furnace	492,517	$24,350	545,086	$27,674
Steel, electric	223,111	11,085	222,673	10,960
Sewage treatment	153,594	8,267	180,399	9,827
Acid water neutralization (mine or plant)	93,681	5,130	97,379	5,827
Water purification	84,576	4,694	89,830	5,169
Steel, open-hearth	39,439	1,955	W	W
Paper and pulp	21,388	1,020	30,259	1,482
Agriculture	18,907	1,230	20,245	1,381
Metallurgy, other	1,415	W	W	W
Other[1]	378,130	23,951	433,832	27,862
Total	1,506,758	81,682	1,619,703	90,182

W Withheld to avoid disclosing company proprietary data; included with "Other."
[1]Includes alkalies, animal and human food, briquetting (1984), desiccant (1984), explosives (1984), fiberglass (1984), glass, oil well drilling, other ore concentration, manganese, mason's lime, other chemical and industrial uses, paint, petroleum refining, refractories, sand lime brick, silica brick, soil stabilization, sugar refining, sulfur removal from stack gases, tanning, wire drawing, and uses indicated by symbol W.

Mica.—Gross Mineral Corp. mined mica (sericite) from an open pit near Fairfield in Adams County. The material was processed at a plant in Aspers for use as an extender and filler.

Peat.—In 1984, seven companies reported peat production. Most of the output came from Lackawanna, Luzerne, and Monroe Counties in the northeastern part of the State.

Sand and Gravel.—*Construction.*—Construction sand and gravel production is

surveyed by the U.S. Bureau of Mines for even-numbered years only; therefore, this chapter contains only estimates for 1983. Data for odd-numbered years are based on annual company estimates made before yearend.

Output of sand and gravel increased for the first time since 1978, reflecting improved conditions in the construction industry. In 1984, sand and gravel was mined from 136 pits with the 20 largest accounting for 50% of the State's production. Permits to mine a total of about 16,000 short tons per day of sand and gravel in Beaver, Bucks, Franklin, and Wyoming Counties were pending with the State's Department of Environmental Resources (DER) for four companies at yearend.

Allegheny, Armstrong, and Beaver Counties accounted for about 23% of Pennsylvania's production and nearly 30% of the value of production, primarily because of strong demand from the Pittsburgh market. Much of the high-quality aggregate was dredged from the lower Allegheny River. Also indicative of that area's market, was an average unit price of $5.63 per ton, f.o.b. plant, for the three counties compared with an average price of $4.09 per ton for the remainder of the State's production.

Table 6.—Pennsylvania: Construction sand and gravel sold or used in 1984, by major use category

Use	Quantity (thousand short tons)	Value (thousands)	Value per ton
Concrete aggregate	4,240	$21,029	$4.96
Plaster and gunite sands	358	1,741	4.87
Concrete products	322	1,687	5.23
Asphaltic concrete	1,443	6,997	4.85
Road base and coverings[1]	1,473	5,839	3.96
Fill	539	2,044	3.79
Snow and ice control	215	891	4.14
Other[2]	5,881	24,057	4.09
Total or average	[3]14,472	64,285	4.44

[1]Includes road and other stabilization (cement).
[2]Includes roofing granules and other unspecified uses.
[3]Data do not add to total shown because of independent rounding.

During the year, an attempt by local officials to halt mining of sand and gravel in Mount Bethel, Northampton County, failed, but the effort was expected to continue in 1985. Stabler Co. Inc., the State's fifth leading producer, purchased a 28-acre site from Alpha Portland Cement Co. in 1983. The sales agreement included transfer of a permit from DER to mine sand and gravel at the site. Toward yearend, local officials appealed a county court decision that allowed mining, contending that mining violated zoning regulations.

In another action affecting one of the State's leading producers, the DER decided to evaluate permits for dredging operations on a case by case basis. Previously, compliance with standards on the amount of solid particles contained in waste water was required. The ruling allowed Davison Sand & Gravel Co. to continue operating the dredge *Allegheny*. The vessel is Pennsylvania's only dredge that processes riverbed material onboard and has been on operation for over 50 years on the Allegheny River. Until the ruling, Davison, which employed about 400 workers in 1984, was in violation of the standards and was expected to be shut down in 1985. The dredged material was used primarily for concrete aggregate.

Another of the State's dredging operators and major producers, Glacial Sand & Gravel Co., began using a high-pressure spray and gravity separation equipment to remove coal, wood, and other materials common in gravel deposits from the Allegheny River. The plant in Bridgeburg has the capacity to process about 375 tons of material per hour year-round.[15]

Industrial.—Production of industrial sand decreased 13% in 1984 compared with that of 1983. Three companies, one each in Allegheny, Carbon, and Huntingdon Counties, accounted for the output. More than one-half of the industrial sand produced was used in glass container manufacture.

Stone.—Stone production is surveyed by the U.S. Bureau of Mines for odd-numbered years only; therefore, this chapter contains only estimates for 1984. Data for even-numbered years are based on annual company estimates made before yearend.

Crushed.—Output in 1984 increased 9% in response to demand from the construction industry. During the year, a compromise was reached between J. M. Brenner Co. and local residents concerning reopening a limestone quarry near Lancaster. The agreement limited mining to 200,000 short tons per year for 4-1/2 years, and reclamation, blasting, and bonding procedures were detailed.

Warner Co.'s expansion plans for its Cedar Hollow Quarry near Devault in Chester County were approved by the DER, allowing the company to increase its 102-acre mining site by an additional 47 acres. The approval was conditional on Warner conducting water quantity and quality measurements and also stipulated that Warner must restore or replace any public or private water supplies that are contaminated or diminished by the quarry operation. The quarry, from which an average of about 4,000 tons per day of dolomite was mined, has been in operation since 1899.

Hempt Bros. Inc. continued efforts to obtain local approval for opening a 400,000-ton-per-year limestone quarry near Allen with reserves at that capacity for 32 years. The quarry plan opposed by a residents group was approved by local officials but appealed by the group to Cumberland County Court. Hempt Bros., originally expected to begin mining in September 1984, must also receive a DER permit after local approval.

Permits to mine about 4,300 tons of crushed stone per day in Fayette and Lackawanna Counties were pending with DER for two companies at yearend.

Dimension.—Sandstone, slate, and granite (diabase) were quarried. Most of the output of 44,000 short tons was produced in the eastern part of the State. Primary uses were for irregular-shaped stone, flagging, cut stone, and roofing slate. A new flagstone quarry in Somerset County, with a proposed production of about 400 tons per year, was in permit review by DER.

METALS

Metal mining in Pennsylvania ceased in 1983 with the closing of the underground zinc mine at Friendsville. Commodities discussed in this section are processed from materials received from both foreign and domestic sources. Production and value data for these commodities are given if available. The value of nonfuel mineral production in Pennsylvania of $708.4 million in 1984 includes only the commodities discussed in the "Nonmetals" section.

Abrasives.—Three companies in western Pennsylvania manufactured metallic abrasives and steel shot and grit. Nationally, the State ranked first in production and operated 4 of the 12 plants in the United States. Silicon carbide, an artificial abrasive, was manufactured by one company in southwestern Pennsylvania.

Beryllium.—Brush Wellman Inc. announced a 3-year, $57 million expansion program to double manufacturing capacity of beryllium-copper strip. About $12 million was for two additional mill hardening furnaces and improvements to existing equipment at the company's Reading finishing facility. The expansion reflected a continuing growth in beryllium-copper demand from the electronics industry.[16]

Also in Reading, the Cabot Berylco Div. of the Cabot Corp. manufactured beryllium-copper strip and beryllium alloys. Cabot and Brush Wellman are the Western World's only beryllium-copper producers.

Ferroalloys.—In 1984, the State's ferroalloys industry reported production of 7,682 short tons valued at $32.6 million. The strong U.S. dollar, relative to foreign currencies, and low-priced imports continued to force ferroalloy producers to lower prices. Indicative of that trend in Pennsylvania was a comparison with 1980 output of 6,823 tons valued at $92.6 million; production in 1984 increased 13%, and value declined by $60 million. A slight measure of improvement in prices was indicated in October when Reading Alloys Inc., Robesonia, increased vacuum-grade ferrocolumbium prices to $17.70 per pound, f.o.b. plant.[17] Reading was one of five domestic producers of ferrocolumbium.

Iron and Steel.—In 1984, shipments of pig iron totaled 7.6 million short tons valued at $1.6 billion, up slightly from 1983 levels as was steel production, which totaled 14.4 million tons. Nationally, the State ranked third in both, accounting for 15% of the pig iron shipments and 16% of the steel production. Since 1979, the State's pig iron and steel shipment levels dropped 11.5 million tons and 13.8 million tons, respectively.

Plant closings and company restructuring during the past 5 years severely affected employment in the Pittsburgh area, which includes Allegheny, Beaver, Washington, and Westmoreland Counties. A decline of 56,200 jobs since the prerecession peak of 90,000 workers in 1979 left basic steel manu-

facturing employment in the area at an all-time low of 33,200 at yearend.[18] Nationally, for the same period, steel employment declined from 570,000 to 343,000 or by about 40%. In the Pittsburgh area, employment declined 62%.

In 1984, about 26 million tons of foreign steel was sold in the United States, which accounted for about a 26% share of the domestic market. Steel industry demands to reduce imports were addressed in September when the Federal Government announced a 5-year bilateral agreement program to restrict imports of certain types of steel. Through this program, agreements with foreign steel-producing countries were initiated to restrict imports of finished steel to 18.5% of the U.S. market.

USS continued restructuring its Monongahela Valley (Mon Valley) operations in southwestern Pennsylvania, shutting down two blast furnaces and a basic oxygen process furnace at its Duquesne plant. At the Clairton Coke Works, three of eight coke batteries were indefinitely shut down, eliminating 2,400 tons of coke production per day. The five operating batteries have about a 5,000- to 6,000-ton per day production capacity. USS also idled the coke batteries at its Fairless Coke Works in Bucks County. Coke for the Fairless Works was then supplied from Clairton.

In May, USS closed its Johnstown foundry operations after union members voted against contract concessions. The operation was purchased by local investors and renamed The Johnstown Corp. with partial production resuming in July. Also during the year, USS resumed rebuilding a blast furnace at the Edgar Thomson Works. The $81 million project had been suspended in 1982 and was the first major investment in the company's Mon Valley operations since that time. At yearend, employment at the Mon Valley operations, which comprised the bulk of USS steelmaking capacity in Pennsylvania, was about 5,050 with 11,200 workers laid off.

In an effort to aid unemployed steelworkers, USS and the United Steelworkers of America Union implemented a $4 million assistance program. Job search assistance and counseling was offered at centers in Pittsburgh, Fairless Hills near Philadelphia, Gary, IN, South Chicago, IL, and Cleveland, OH, for an estimated 10,000 dislocated workers.

USS and Bethlehem Steel joined in a 5-year, $33 million project to develop a process to directly cast 1-inch-thick slabs rather than 10-inch slabs produced with conventional casters. Thin slab casting was expected to result in $45-per-ton savings primarily because of reduced energy costs along with lower operating and equipment costs. About $29 million of the funding was provided by the U.S. Department of Energy, which was entitled to receive a return of one and one-half times its original investment if the technology is developed and marketed.[19]

Bethlehem Steel's restructuring plans included an $18 million expansion of its rail mill in Steelton. The plan was approved near yearend after union workers accepted a manning and work assignment agreement expected to reduce plant employment from about 2,600 to 2,000. The expansion at the Steelton plant, which is one of three domestic rail operations, would increase rail capacity by 50% to 450,000 tons per year and add the capability to produce rail in excess of 80 foot lengths. Bethlehem Steel also began a $50 million modernization project at its 48-inch structural mill at Bethlehem. At that mill, ingots are reduced into structural shapes such as I-beams used in construction. The project, which was expected to take 2 years to complete, was approved after union members agreed to negotiate revisions in work practices and work crews, both of which would reduce the work force. An agreement between Bethlehem Steel and Abex Corp., a subsidiary of IC Industries Inc., resulted in reopening steelmaking facilities in Somerset County. At midyear, Bethlehem Steel began purchasing a minimum of 10,000 tons of ingots monthly from Abex for finishing at its Johnstown bar, rod, and wire plant. The Abex facility had been closed since 1981.

LTV Steel Co. was formed through the merger of Jones & Laughlin Steel Corp., a subsidiary of LTV Corp., and Republic Steel Corp. The company indefinitely idled its Pittsburgh Works at midyear after reopening in January. Also idled was the firm's welded tube mills at the Aliquippa Works.

Titanium.—A. Johnson Metals Corp., Lionville, ceased production of ferrotitanium late in 1984, citing a competitive disadvantage because of low-priced imports. However, it continued to be a supplier of titanium scrap and produced as-cast titanium slab from scrap at its electron-beam furnace melting facility in Morgantown. In addition, this company became the exclusive agent for sales of calcium metal granules produced by Extramet Industries S.A.

of France.[20] Calcium metal is an additive in steelmaking for final deoxidation, desulfurization, and inclusion shape control.

Zinc.—Zinc mining in Pennsylvania ceased in 1983 with the closing of the Friendsville Mine. St. Joe Minerals Co., a subsidiary of Fluor Corp., the largest U.S. zinc smelting company, continued operating its 91,000-short-ton-per-year electrothermic zinc smelter at Monaca, PA. Zinc concentrates were shipped from St. Joe's Balmat and Pierrepont Mines in New York. The company also produced zinc oxide.

Zinc oxide was also produced by The New Jersey Zinc Co. Inc. at its 82,000-ton-capacity plant in Palmerton. Output dropped in 1984, primarily because of a 3-week strike by union workers at New Jersey Zinc's Sterling Mine in New Jersey.

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[1]State Mineral Officer, Bureau of Mines, Pittsburgh, PA.

[2]State geologist, Pennsylvania Bureau of Topographic and Geologic Survey, Department of Environmental Resources, Harrisburg, PA.

[3]Economic geologist, Pennsylvania Bureau of Topographic and Geologic Survey, Department of Environmental Resources, Harrisburg, PA.

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[16]American Metal Market. Electronics Growth Spurs Brush's Beryllium Expansion. June 28, 1984, p. 1.

[17]———. Reading Alloys Raises Vacuum Ferrocolumbium to $17.70/lb. Sept. 21, 1984, p. 1.

[18]Commonwealth of Pennsylvania, Department of Labor and Industry. Layoffs in Steel Pull Factory Employment to New Low. Labor Mark. Lett. Pittsburgh Area, v. 38, No. 4, Fourth Quarter 1984, p. 2.

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[20]American Metal Market. Johnson Metals Division To Market Calcium. Oct. 24, 1984, p. 10.

Table 7.—Principal producers

Commodity and company	Address	Type of activity	County
Abrasives (manufactured):			
Durasteel Abrasives Co	2601 Smallman St. Pittsburgh, PA 15222	Plant	Westmoreland.
Ervin Industries Inc	Box 1168 Ann Arbor, MI 48106	do	Butler.
Pangborn Co	Etna St. Butler, PA 16001	do	Do.
Satellite Alloy Corp	Satellite Industrial Park Box 171 Springdale, PA 15144	do	Allegheny.
Cement:			
Hercules Cement Co	Center St. Stockertown, PA 18083	Plant and quarry.	Northampton.
Lone Star Industries Inc	Wood & Prospect St. Box 270 Nazareth, PA 18064	Plant	Do.
National Gypsum Co	501 Hokes Mill Rd. York, PA 17404	do	Berks.
Société des Ciments Français	Tour Générale, Quartier Villon Cédex 22 192088 Paris, La Défense France	Plants and quarries.	Lehigh and Northampton.
Clays and shale:			
Glen-Gery Corp	Box 1542 Reading, PA 19603	Pits and plant	Adams, Berks, Northumberland, Union, York.
Hanley Brick Inc	77 Pickering St. Brookville, PA 15825	Pit	Jefferson.
McAvoy Vitrified Brick Co	Phoenixville, PA 19460	Pit	Chester.
Medusa Corp	Box 5668 Cleveland, OH 44101	Pit	Lawrence.
Watsontown Brick Co	Box 68 Watsontown, PA 17777	Pit	Northumberland.
Graphite (manufactured):			
Airco Speer Carbon Co	800 Theresia St. St. Marys, PA 15857	Plant	Elk.
Keystone Carbon Co	1935 State St. St. Marys, PA 15857	do	Elk.
The Stackpole Corp	St. Marys, PA 15857	do	Elk.

Table 7.—Principal producers —Continued

Commodity and company	Address	Type of activity	County
Lime:			
Bethlehem Steel Corp.[1]	Martin Tower Bethlehem, PA 18016	Plants and quarries.	Adams and Lebanon.
Marblehead Lime Co	300 West Washington St. Chicago, IL 60606	Plant and mine.	Centre.
Mercer Lime & Stone Co	525 William Penn Pl. Pittsburgh, PA 15219	Plant	Butler.
Warner Co	Yellow Springs Rd. Devault, PA 19432	Plant, mine, quarries.	Centre and Chester
Peat:			
Corry Peat Products Co	515 Turnpike Rd Corry, PA 16407	Bog	Erie.
Gouldsboro Wayne Peat Co	Box 68 Gouldsboro, PA 18424	Bog	Lackawanna.
Hyponex Corp	2013 South Anthony Blvd Fort Wayne, IN 46803	Bog	Monroe.
Lake Benton Peat Moss	622 South Blakely St. Dunmore, PA 18512	Bog	Lackawanna.
Perlite (expanded):			
Allied Block Chemical Co., Therm-O-Rock Div.	Pine St. New Eagle, PA 15067	Plant	Washington.
Pennsylvania Perlite Corp	Box 2002 Lehigh Valley, PA 18001	Plants	Lehigh and York.
World Industries Inc	Lancaster, PA 17603	Plant	Lancaster.
Sand and gravel:			
Construction:			
Davison Sand & Gravel Co	3d Ave. and 4th St. New Kensington, PA 15068	Dredge and pit.	Armstrong and Westmoreland.
Dravo Corp	4800 Grand Ave. Pittsburgh, PA 15222	Dredge, pit, plant.	Allegheny and Beaver.
Glacial Sand & Gravel Co	Box 1022 Kittanning, PA 16201	do	Armstrong.
Stabler Co. Inc.[1]	Box 3188 Wescoville, PA 18106	Pits and plants.	Bradford and Northampton.
Warner Co.	699 Bristol Pike Morrisville, PA 19067	Pit and plant	Bucks.
Industrial:			
McCrady Inc	Box 11566 Pittsburgh, PA 15238	Quarries and plant.	Allegheny.
Pennsylvania Glass Sand Corp	Box 187 Berkeley Springs, WV 25411	do	Huntingdon.
Slag—Iron and steel:			
Dunbar Slag Co	Box 666 Sharon, PA 16146	Plant	Mercer.
Standard Slag Co	1200 Stambaugh Bldg. Youngstown, PA 44503	do	Cambria
Stone:			
Crushed:			
The General Crushed Stone Co., a subsidiary of Koppers Co. Inc.	Box 231 Easton, PA 18042	Quarries and plants	Berks, Bucks, Chester, Clinton, Columbia, Dauphin, Delaware, Lancaster, Montour, Tioga, York.
New Enterprise Stone & Lime Co. Inc	R.D. 3 New Enterprise, PA 16664	do	Adams, Bedford, Blair, Cumberland, Franklin, Huntingdon, Lancaster, Somerset.
Dimension:			
H. Dally & Sons Inc	Railroad Ave., Box 27 Pen Argyl, PA 18072	Quarries and mills.	Northampton.
Delaware Quarries	Route 32 Lumberville, PA 18933	Quarry	Bucks.
Media Quarry Co	131 East 2d St. Media, PA 19063	do	Delaware.
Pennsylvania Granite Corp	Box 510 St. Peters, PA 19470	do	Chester
Sulfur (recovered):			
Atlantic Richfield Co	3144 Passyunk Ave. Philadelphia, PA 19145	Refinery	Philadelphia.
United States Steel Corp	400 State St. Clairton, PA 15025	Plant	Allegheny.
Vermiculite (exfoliated):			
W. R. Grace & Co	62 Whittemore Ave. Cambridge, MA 02140	do	Lawrence.

[1]Also stone.

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